

September 29, 2000

# **Radioactive Air Emissions License For The University of Washington**

The State of Washington Department of Health

The following are state only applicable requirements from Chapter 246-247 of the Washington Administrative Code .

## **1 EMISSION STANDARDS**

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The emission of radionuclides to the ambient air from the University of Washington as set forth in 40 CFR 61.92 shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem per year. [WAC 246-247-040(1), 3/4/1994]

All existing emission units and nonsignificant modifications shall utilize ALARACT. [WAC 246-247-040(4), 3/4/1994]

## **2 APPLICABLE REQUIREMENT TERMS**

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A Notice of Construction (NOC) is written information submitted under WAC 246-247-060(1) and (2) that provides information listed in WAC 246-247-110 "Appendix A - Application information requirements." This information must include the effective dose equivalent (EDE). The EDE is calculated using the source term derived from the COMPLY CODE, or other EPA, or State of Washington, Department of Health (Health) approved method.

**WAC 246-247-060(1)** requirements for new construction or modification of emission units are as follows:

Early in the design phase, the applicant shall submit a NOC containing the information required in Appendix A of WAC 246-247.

Within thirty days of receipt of the NOC, Health shall inform the applicant if additional information is required. The department may determine, on the basis of the information submitted, that the requirements of BARCT or ALARACT have been met, or may require

the applicant to submit a BARCT or ALARACT demonstration compatible with Appendix B or C of WAC 246-247, respectively.

Within sixty days of receipt of all required information, Health shall issue an approval or denial to construct. The department may require changes to the final proposed control technology.

The applicant may request a phased approval process by so stating and submitting a limited application. Health may grant a conditional approval to construct for such activities as would not preclude the construction or installation of any control or monitoring equipment required after review of the completed application.

Health shall issue a license, or amend an existing license, authorizing operation of the emission unit(s) when the proposed new construction or modification is complete. For facilities subject to the air operating permit requirements of chapter 173-401, the license shall become part of the air operating permit issued by the Department of Ecology or a local air pollution control authority. For new construction, this action shall constitute registration of the emission unit(s).

**WAC 246-247-060(2)** requirements for modification of unregistered emission units that are not exempt from the regulations are as follows:

The applicant shall submit an application containing the information required in Appendix A of WAC 246-247.

Within thirty days of receipt of the application, Health shall inform the applicant if additional information is required. The department may determine, on the basis of the information submitted, that the requirements of BARCT or ALARACT have been met, or may require the applicant to submit a BARCT or ALARACT demonstration compatible with Appendix B or C of WAC 246-247, respectively.

Within sixty days of receipt of all required information, Health shall issue or amend the license. For facilities subject to the air operating permit requirements of Chapter 173-401, the license shall become part of the air operating permit issued by the department of ecology or a local air pollution control authority. This action shall constitute registration of the emission unit(s). A determination of non-compliance may result in the issuance of a Notice of Violation.

Health reserves the right to require the owner of an existing, unregistered emission unit to make modifications necessary to comply with the applicable standards of WAC 246-247-040.

The University of Washington shall notify the department of Health at least seven calendar days before any planned pre-operational tests of new or modified emission units that involve emissions control, monitoring, or containment systems of the emission unit(s). The department reserves the right to witness these tests under WAC 246-247-060 (4).

The ALARACT requirement means the use of radionuclide emission control technology that achieves emission levels that are consistent with ALARA. ALARACT compliance is demonstrated by evaluating the existing control system and proposed nonsignificant modification

in relation to applicable technology standards and other control technologies operated successfully in similar applications. An ALARACT compliance demonstration is used for inspection or audit purposes, and to demonstrate compliance with the substantive ALARACT technology standard. [WAC 246-247 030(4), 3/4/1994] [WAC 246-247 130(Appendix C), 3/4/1994]

### 3 MONITORING, TESTING, QUALITY ASSURANCE, RECORD KEEPING AND REPORTING

Unless otherwise noted, monitoring, testing and quality assurance must be performed under the requirements of WAC 246-247-075, 3/4/1994.

Reporting and record keeping must be performed under the requirements of WAC 246-247-080, 3/4/1994.

### 4 EMISSION UNITS SPECIFIC APPLICABLE REQUIREMENTS TABLES

The following table lists the regulatory requirements for monitoring, emission abatement and specific limits and conditions in approved Notice of Construction applications.

In lieu of effluent monitoring at the stack, compliance with emission limits shall be demonstrated using the COMPLY code and by limiting radionuclide possession quantities to that listed in Table 4.1. [WAC 246-247-040(5), 3/4/1994]

Table 4.1				
Building	Radionuclide	Release Form*	Possession Quantity in Curies	Unabated Release Rates in Curies/Year
<b>New Fisheries Building</b> [NOC Approval Air 99-803, 8/5/1999]	C-14	Liquid	4.74E-04	Combined Forms
	C-14	Volatile	5.00E-05	1.01E-04
	H-3	Liquid	1.42E-03	Combined Forms
	H-3	Volatile	2.95E-04	5.92E-04
	P-32	Liquid	5.89E-09	1.18E-11
	P-33	Volatile	4.00E-07	8.00E-07
<b>New Oceanography Building</b> [NOC Approval Air 99-803, 8/5/1999]	Ac-227	Liquid	1.91E-08	3.82E-11
	C-14	Solid	2.45E-04	Combined Forms
	C-14	Liquid	1.79E-01	1.26E-02
	C-14	Volatile	3.57E-03	"
	C-14	Gas	2.57E-03	"
	Ca-45	Solid	9.91E-13	1.98E-18

Table 4.1				
Building	Radionuclide	Release Form*	Possession Quantity in Curies	Unabated Release Rates in Curies/Year
	H-3	Liquid	6.23E-02	Combined Forms 8.44E-01 “
	H-3	Volatile	1.38E-02	
	H-3	Gas	4.08E-01	
	Pb-210	Volatile	1.50E-07	3.00E-07
	Po-208	Liquid	3.52E-11	7.05E-14
	Po-209	Liquid	8.91E-10	1.78E-12
	Pu-236	Liquid	7.01E-11	1.40E-13
	Pu-242	Liquid	1.50E-10	3.00E-13
	S-35	Liquid	3.28E-04	6.57E-07
	Th-230	Liquid	5.00E-08	Combined Forms 6.90E-08
	Th-230	Volatile	3.45E-08	
	U-232	Liquid	2.66E-09	5.32E-12
<b>Harborview Medical Center Research and Training Facility</b> [NOC Approval Air 99-1114, 11/20/1998]	C-14	Volatile	1.30E-05	1.28E-05
	C-14	Liquid	2.70E-04	2.70E-07
	Fe-59	Liquid	1.30E-03	1.30E-06
	H-3	Volatile	1.30E-05	1.27E-05
	H-3	Liquid	6.80E-02	6.80E-05
	I-125	Volatile	5.90E-03	5.90E-06
	P-32	Volatile	7.30E-01	7.30E-04
	P-33	Liquid	1.50E-02	1.50E-05
	S-35	Liquid	2.50E-01	2.50E-04
<b>The Cochran Building</b> [NOC Approval Air 00-609, 6/20/2000]	Ac-225	Solid	2.20E-03	2.20E-06
	At-211	Gas	7.00E-02	7.77E-04
	Bi-207	Liquid	1.53E-06	1.52E-09
	Bi-213	Liquid	6.64E-01	6.64E-04
	C-14	Gas	1.46E-04	1.46E-04
	H-3	Gas	2.23E-03	2.23E-03
	I-125	Liquid	1.47E-01	1.47E-04
	I-125	Solid	6.12E-04	6.12E-10
	I-131	Liquid	4.00E-02	4.00E-05
	In-111	Liquid	7.00E-03	7.00E-06
	P-32	Liquid	4.23E-03	4.23E-06
	S-35	Liquid	2.15E-02	2.15E-05
	Y-90	Liquid	5.00E-03	5.00E-06

Table 4.1				
Building	Radionuclide	Release Form*	Possession Quantity in Curies	Unabated Release Rates in Curies/Year
*Materials indicated as "Volatile" are liquids which boil at less than 100° C, or are heated above their boiling point during processing.				
<p>The following Conditions and Limitations are associated with the use of At-211 in the Cochran Building.</p> <ol style="list-style-type: none"> <li>1. After the experimental run, the glove box is allowed to decay for approximately one week. It is then opened and surveyed. Residual chemicals (liquid reagents) can be removed and the apparatus can be cleaned.</li> <li>2. The abatement technology to be used for the At-211 is to include three levels of enclosures. <ul style="list-style-type: none"> <li>• Outside Enclosure: Radionuclide hood, exhausting through charcoal filter to a standard laboratory fume hood.</li> <li>• Intermediate Enclosure: Glove box with ventilation exhaust through a HEPA and charcoal filters to the radioiodine hood.</li> <li>• Experimental Enclosure: The distillation/reaction apparatus is contained inside the glove box, and contains a charcoal filter downstream of the reaction and upstream of the outlet (inside glove box).</li> </ul> </li> <li>3. A post usage survey of the At-211 glove box is required.</li> </ol>				